

NASA Ames Research Center, Computational Sciences Division
National Aeronautics and Space Administration

David A. Maltz

NASA Ames Research Center
Computational Sciences Division



NASA Ames

Sciences Division
Computational

NASA Ames Research Center

Oct 15, 2001

NASA Ames Research Center, Computational Sciences Division

NETMARK

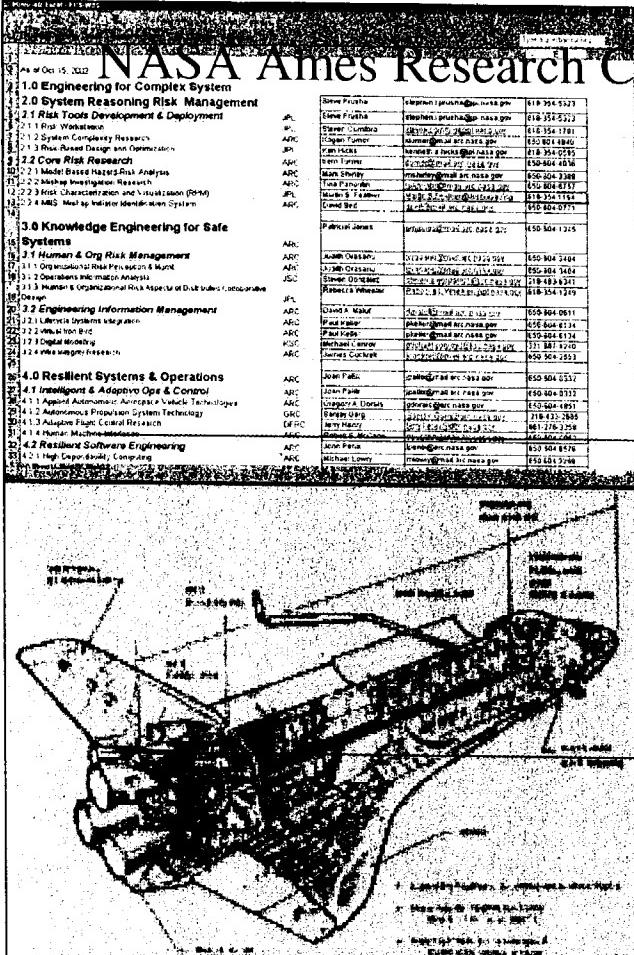
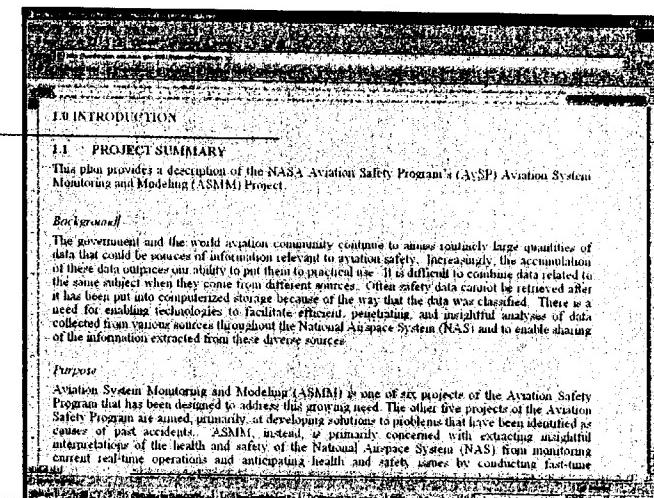
Purpose: to control and interoperate with every block in a document, email, spreadsheet, power point, database, etc. across the lifecycle.

Spread sheet cell

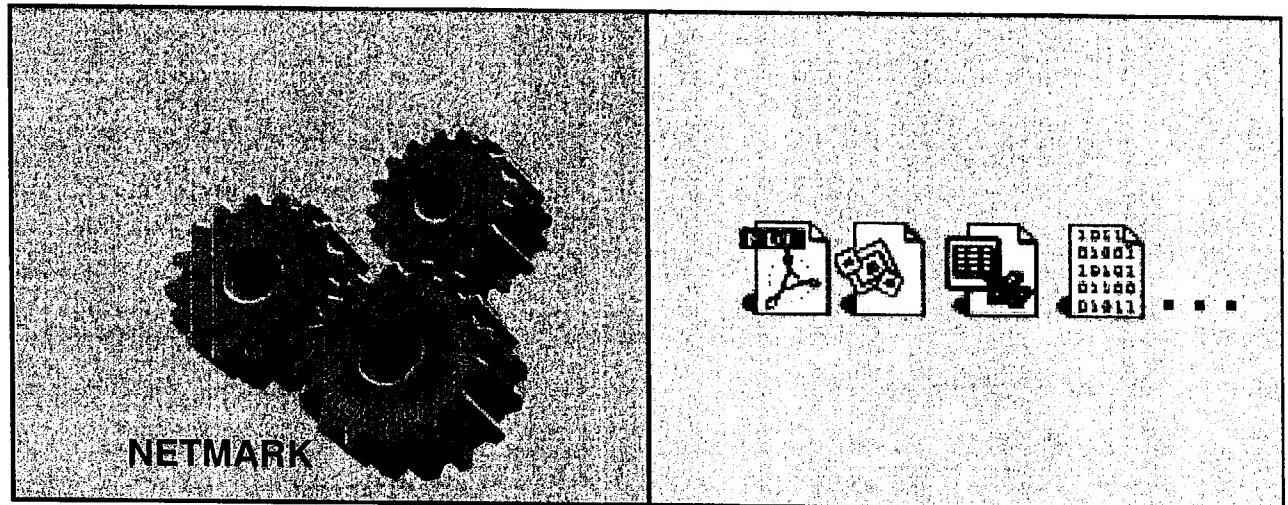
Word document paragraph, title etc.

Media and data

Electronic mail paragraph, subjects, headings, etc.



The Mechanics



Load into Netmark using COTS

Context plus Content search

Regenerate arbitrary documents
from arbitrary fragments

to some extent ...garbage in,
garbage out.

Seamless information System

Sources identified:

Non-normalized data: MS Word documents, Excel, Adobe PDF, XML, HTML, Binary, meta-data.
Normalized data: relational and object oriented.

Interlingua

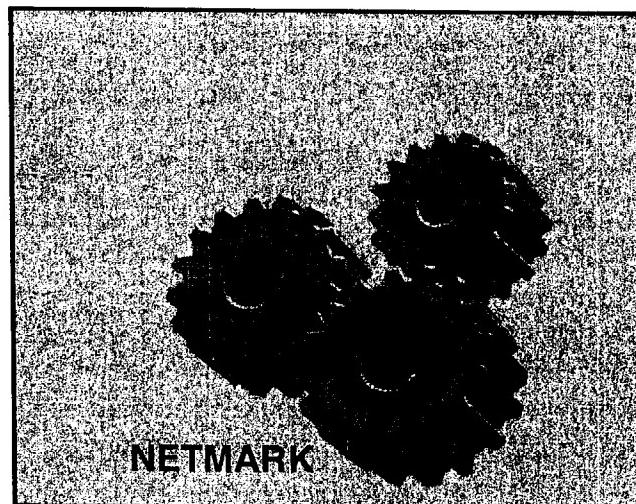
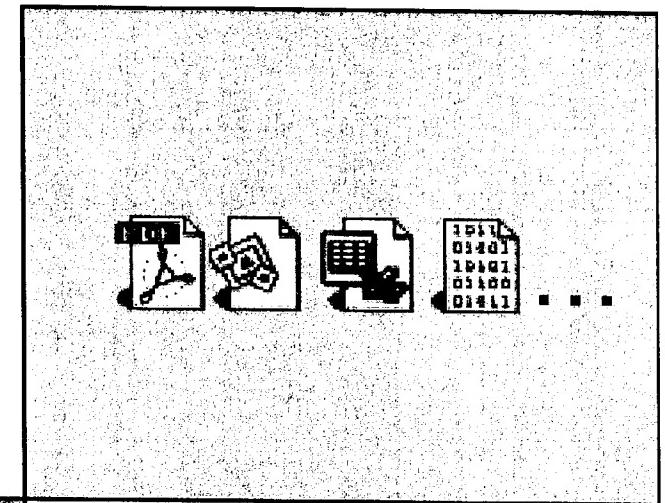
SGML: XML, HTML

Translation:

Microsoft Office
Adobe

Mass Storage:

Oracle



NASA Ames Research Center, Computational
Sciences Division

NETMARK

Dynamic Schema-less Definitions

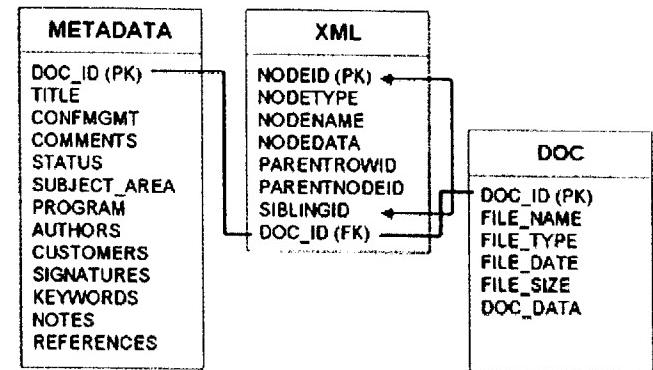


Figure 3: NETMARK Generated Schema

Extensible Architectures

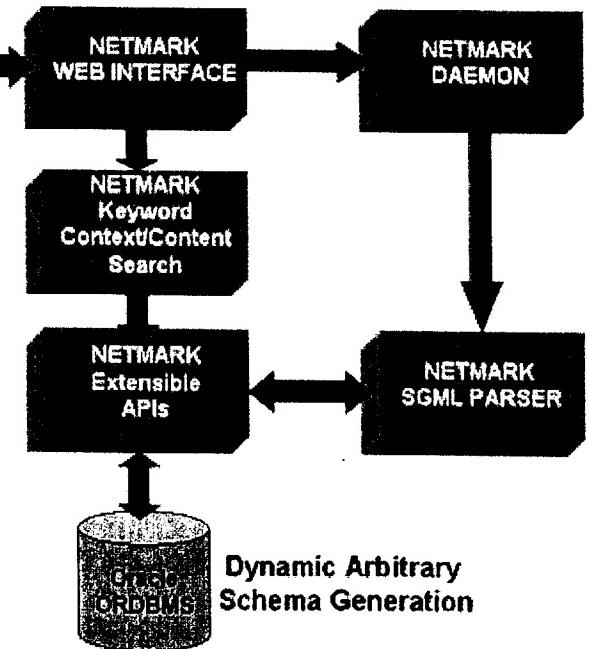


Figure 2: NETMARK Universal Process Flow

Requirements

OPERATING SYSTEM

Sun Solaris™ 2.6, 2.7 & 2.8

Red Hat Linux 7.0 (*)

JDK SUPPORT

Java 2 (JDK 1.2, 1.3)

C/C++

SYNCHRONIZATION WITH RDBMS

Oracle

Extensible API

C/C++

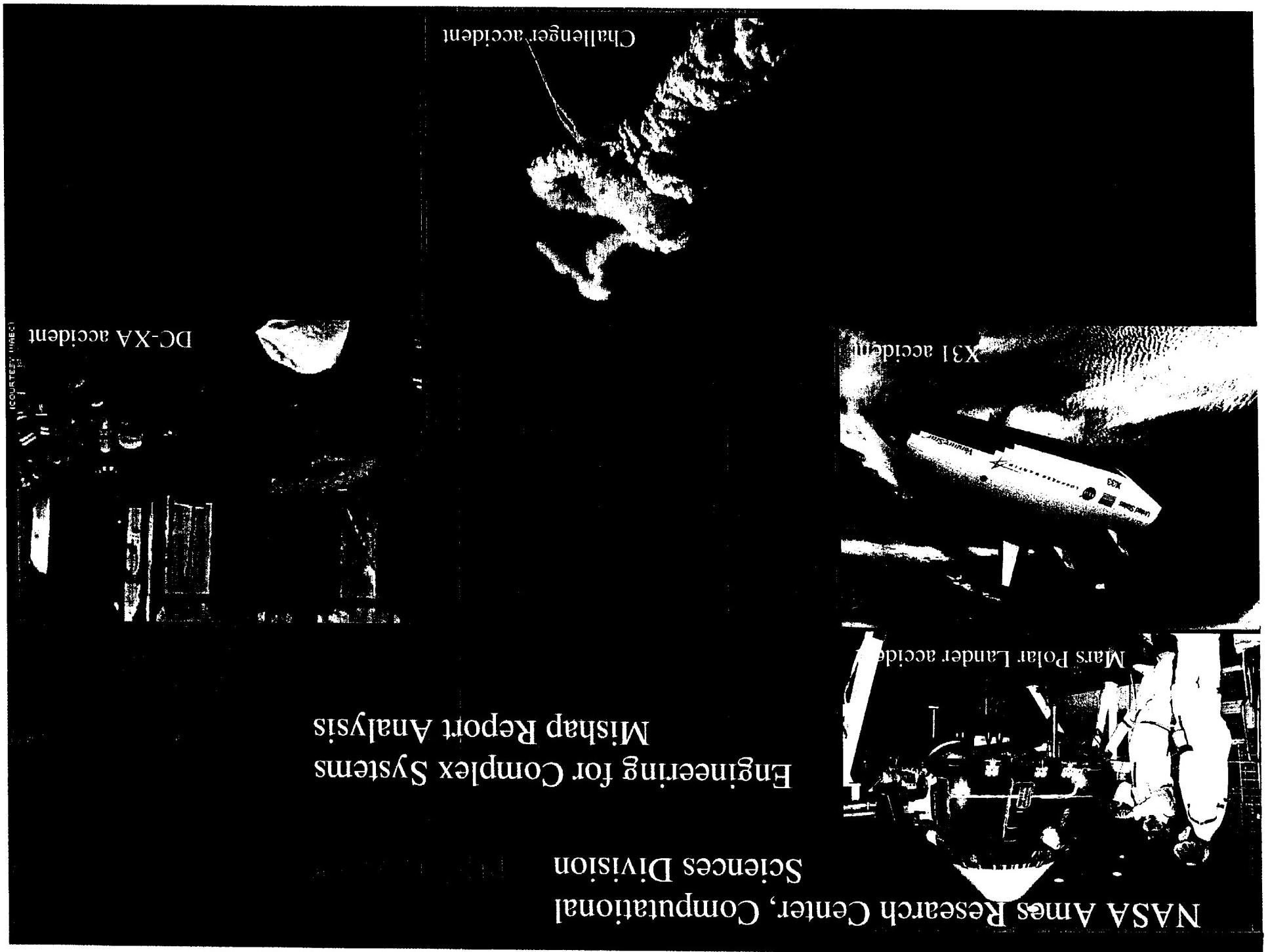
Java

PL/SQL

Out of the Box

WebDav,

NFS, FTP, HTTP



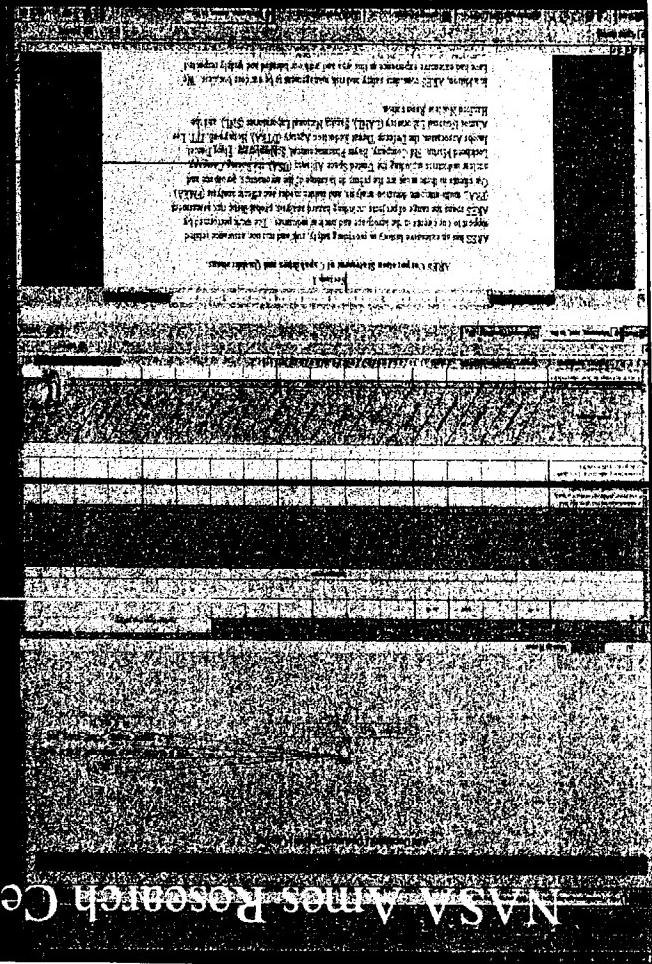
NASA Ames Research Center, Computational Sciences Division

Software development Zero
Setup time/integration 1 FTE, 2 Days

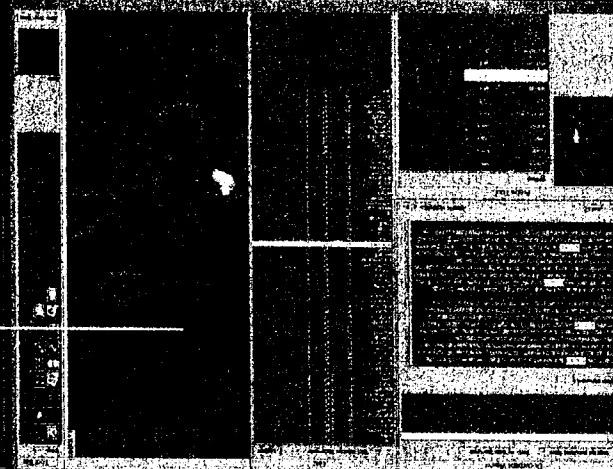
23 Mishap Report Analyzed

Analyses of range of incidents
involving NASA & non-NASA
aircraft/spacecraft

Selected Sections from the Mishap
Reports were loaded into the data
analysis tool



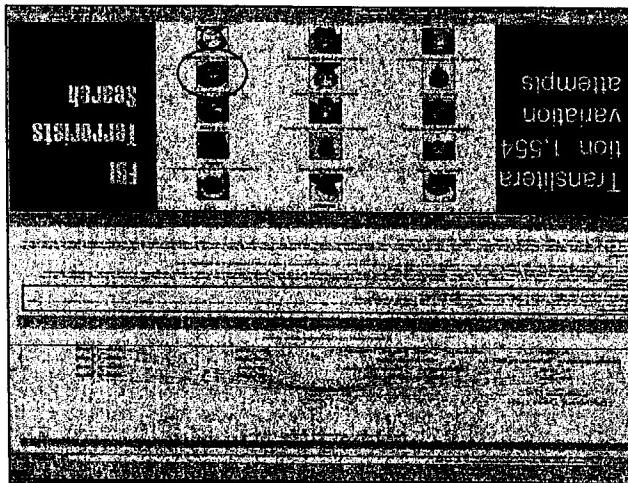
Reports distributed across
a two-dimensional space based
on similarities between reports
Content-based visualization derived
from Galaxies visualization
3D visualization in abstract
landscape that represents areas of
high thematic content



NETMARK

Software development Zero Setup time/integration 0 FTE, 0 Days

Sciences Division



Re-editing: Document construct from disparate documents and fragments, paragraph. Tables.

etc.

Background This document and its predecessor, *Introducing the NASA Aviation Safety Program* (ASPI),¹ have been developed to provide a description of the NASA Aviation Safety Program (ASAP). This document describes the background and rationale for the ASAP, as well as the organization, structure, and operational concepts of the program. The ASAP is a joint NASA and industry effort to develop and demonstrate technologies and operational concepts that will significantly reduce the risk of aircraft accidents. The ASAP is designed to be a long-term, iterative process that will involve the participation of a wide range of stakeholders, including government agencies, industry partners, and academic institutions. The ASAP will focus on developing and validating technologies and operational concepts that can be applied to a variety of aircraft types and flight environments. The ASAP will also work to identify and mitigate potential risks associated with the implementation of new technologies and operational concepts. The ASAP will be guided by a set of core principles, including safety, reliability, and efficiency. The ASAP will also be guided by a set of core principles, including safety, reliability, and efficiency.

NASA Ames Research Center, Computational Sciences Division

International Space Station
Heterogeneous Integration

Integration of databases, heterogeneous in
Provider plus content
Master vehicle database
Problem reporting corrective action database



SHUTTLE PAYLOAD

NASA Ames Research Center, Computational Sciences Division

Mars Exploration Rover - MER
MER CIP HCC

Meta data capture of Mars 03 mission

Speed: 0.000 m/s

Temperature: 21.1 K
Day length: 2.1623 hours
Eclipses: 3344.609 hrs

GOV: 18.10.32.0
Gyro Data Rate

NASA Ames Research Center, Computational Sciences Division

NETMARK

Real time integration

```
<XML>
  <source> Master database
    <access_method> RDBMS
    ...
  <source> PRACA
    <access_method> http://www...
  <preprocess_using>
    <query_template> style_sheet ...
  <postprocess_using>
    <Transliteration> ...
  ...
```

Client Query is loaded from NETMARK (server)

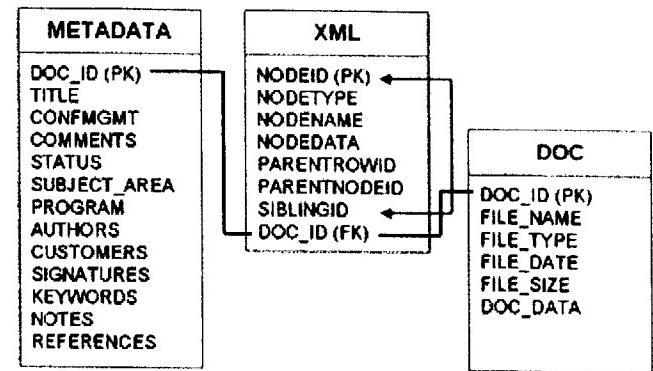


Figure 3: NETMARK Generated Schema

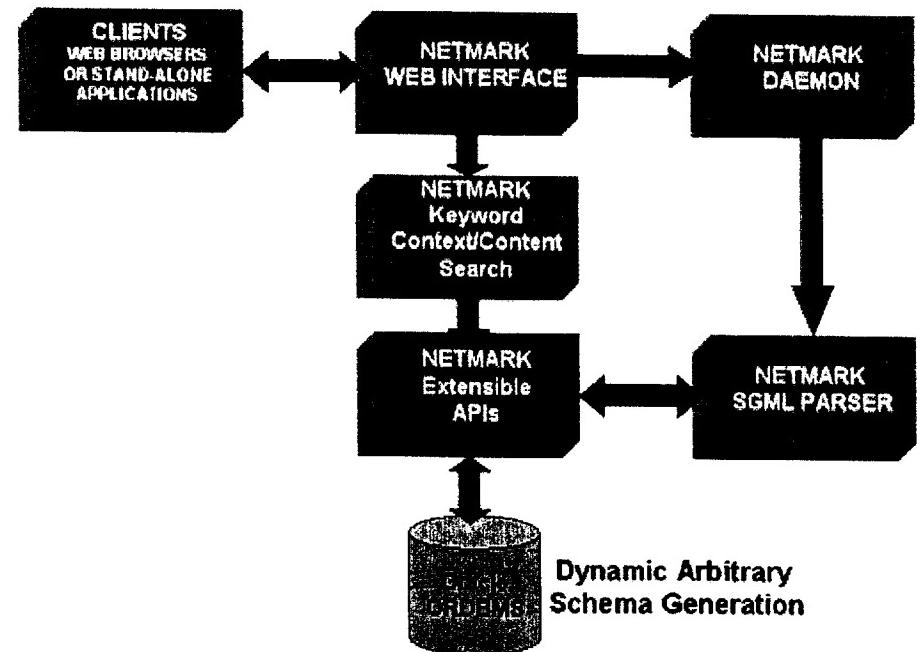
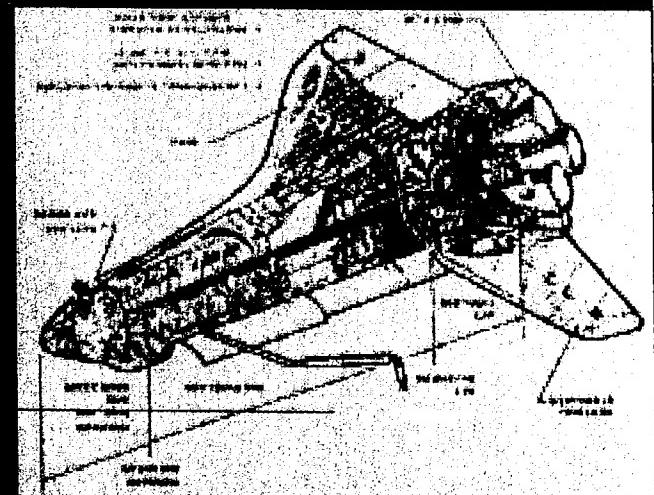


Figure 2: NETMARK Universal Process Flow

Engineering for Complex Systems

Kennedy Space Center Digital Shuttle Project Knowledge management system for a virtual space shuttle orbiter, including legacy data, engineering data, and 3D graphics models.



Sciences Division

- Zero database intervention
- (designed as build)

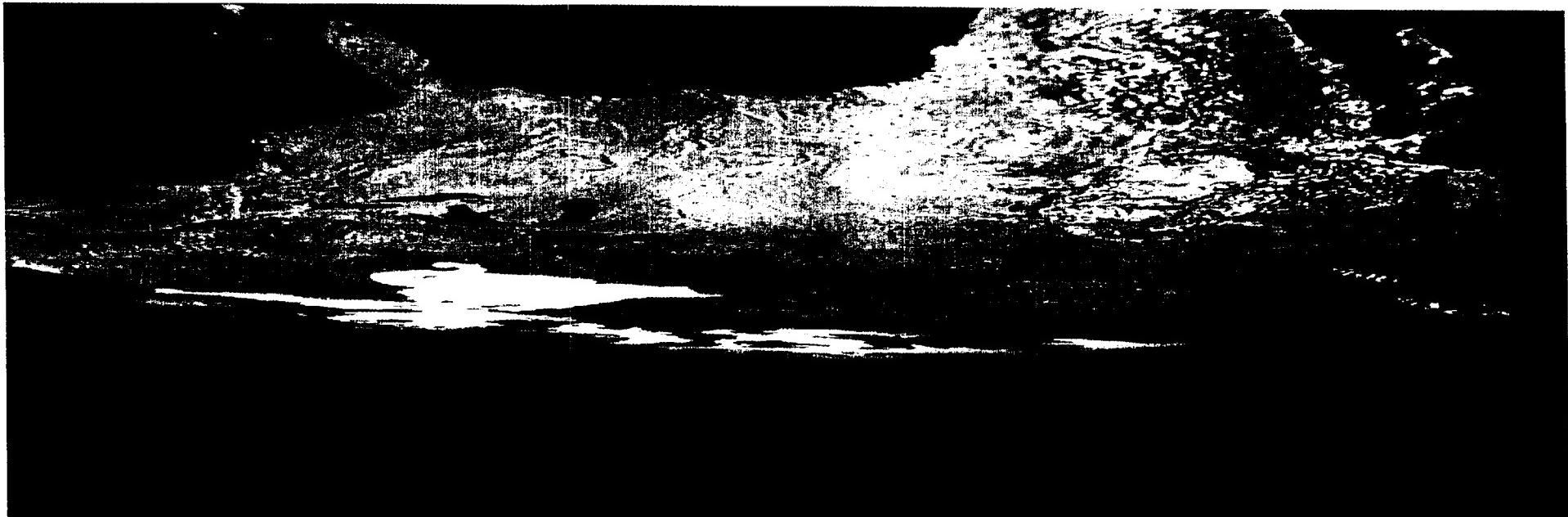
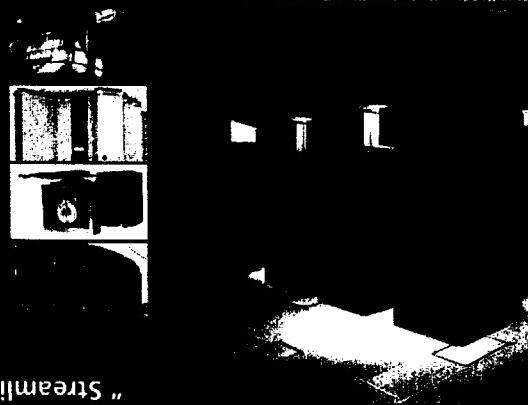
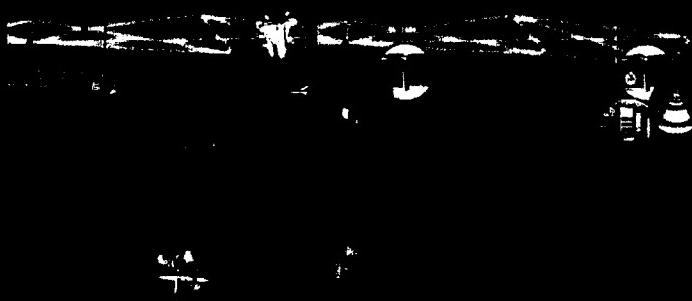
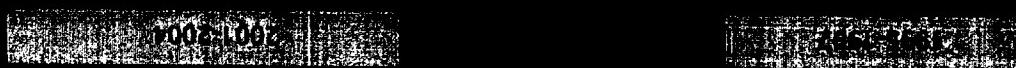


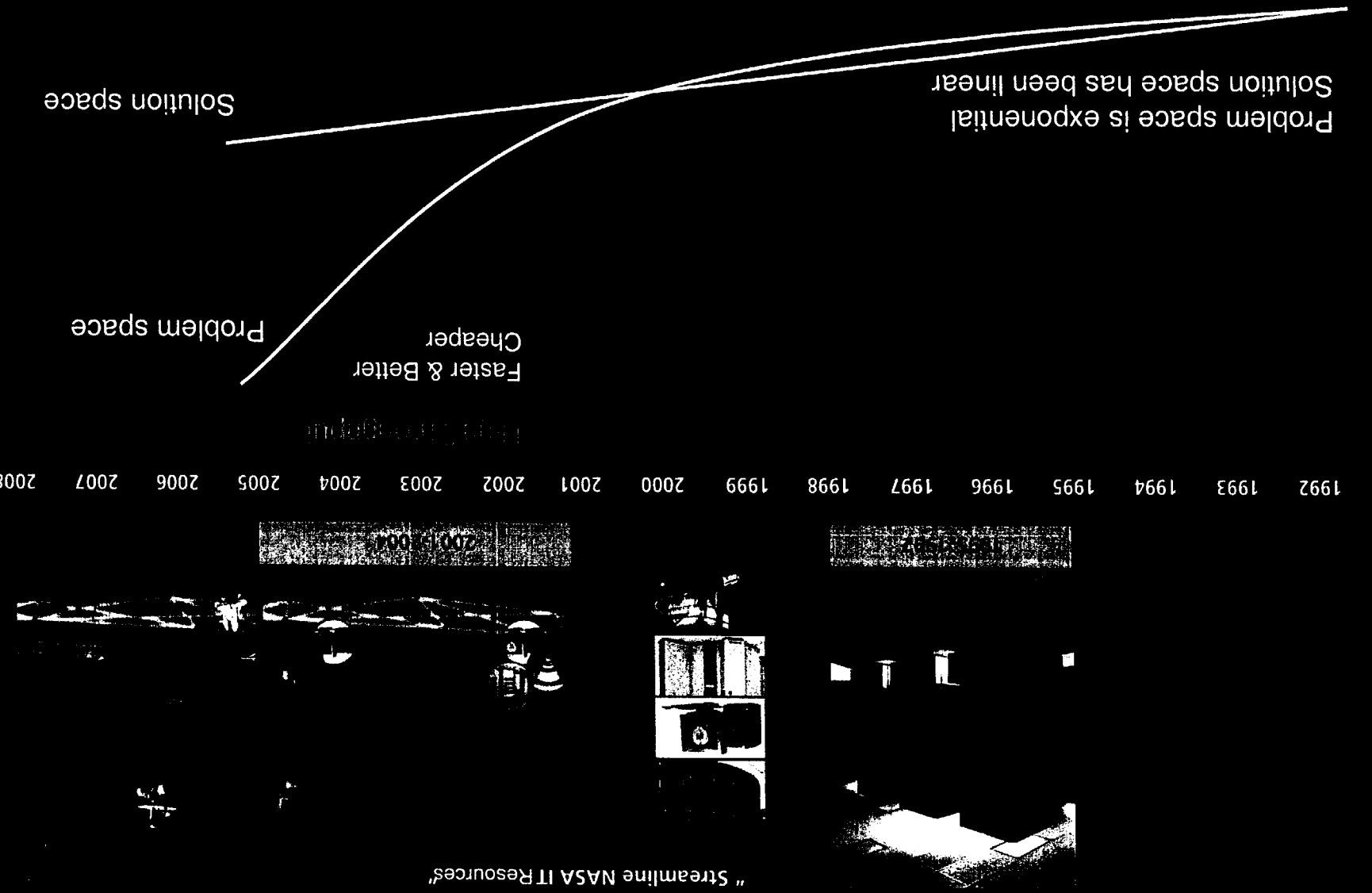
Understanding the
evolution
of Information

"Streamline NASA IT Resources"

NASA Ames Research Center, Computational
Sciences Division

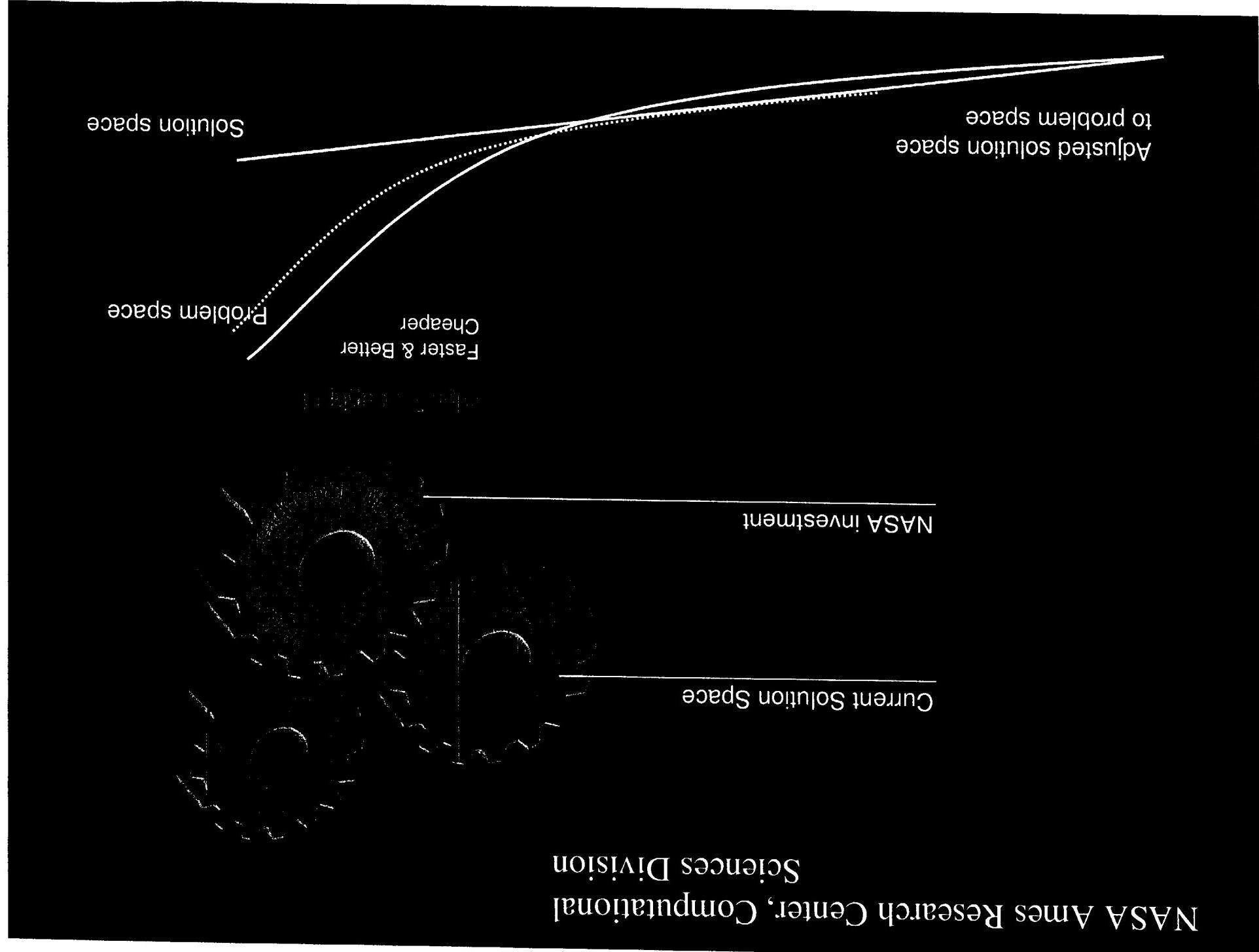
1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008





Sciences Division
Computational

NASA Ames Research Center



What is it to outside NASA

- "Partial Spillovers" for the economics and conditions where third parties derive benefits which they do not pay initially for.
- "Market spillovers" is likely to be an efficiency gain to the end-users of the new technologies.
- "Knowledge spillovers" will happen when firms get cheap access to lessons learned in both technology and successful models.
- "Network spillovers" the synergy and having an open source architecture work on common problems and expand on related pieces in a coordinated way and according to a condensed time schedule.

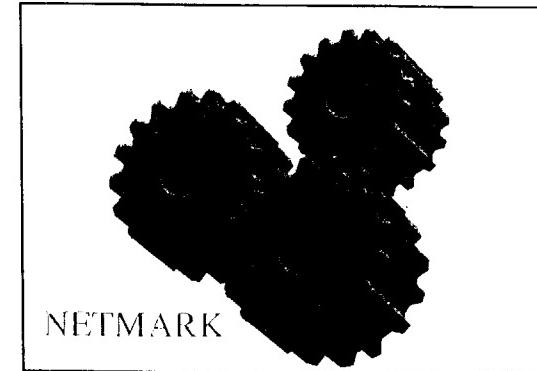
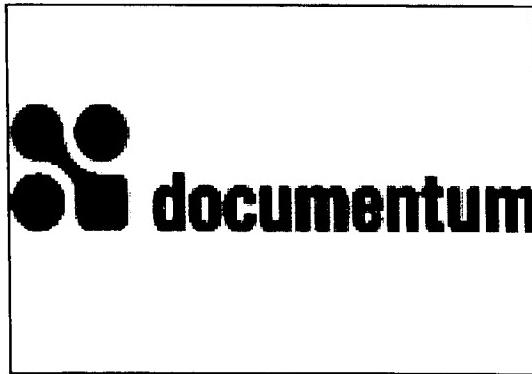
NASA Ames Research Center, Computational
Sciences Division

NETMARK

Integration

Knowledge Management

Collaboration and Sharing



NASA Ames Research Center, Computational Sciences Division

2008

